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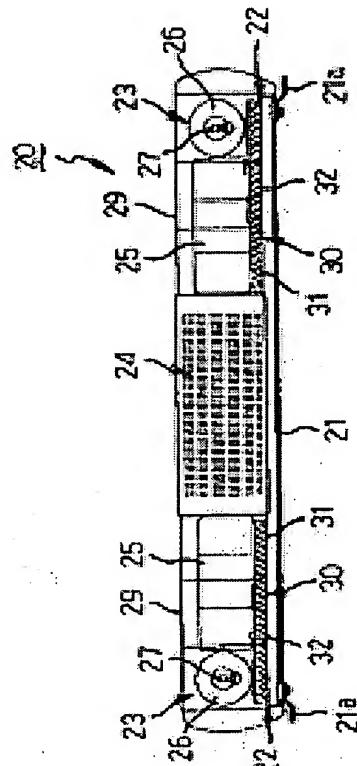
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(54) [Name of the invention] Rotating warning lamp

(57) [Summary] (Revised)

[Purpose] To enhance visibility of the rotating warning lamp.

[Structure] A device configured to substantially enhance the visibility of the rotating warning lamp by causing the LED 32 of an LED luminescence device 30 equipped with a prescribed number of LED 32 and installed on the periphery of base 22 of a rotating warning lamp 20 to blink, or by reflecting the light from the LED 32 in arbitrary directions using a rotating reflective mirror.



[Scope of Patent Claim]

[Claim 1] A rotating warning lamp consisting of a reflective tube rotated by a motor and lamp placed in this reflective tube and equipped with a rotating lamp made to emit light in a perambulating horizontal direction by rotations of the reflective tube, a base of schematic plates supporting this rotating lamp and a transparent globe that covers the abovementioned base and rotating lamp, where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces in a horizontal direction, and the LED luminescence device contains an LED blinking circuit that causes the LED to blink.

[Claim 2] A rotating warning lamp consisting of a reflective tube rotated by a motor and lamp placed in this reflective tube and equipped with a rotating lamp made to emit light in a perambulating horizontal direction by rotations of the reflective tube, a base of schematic plates supporting this rotating lamp and a transparent globe that covers the abovementioned base and rotating lamp, where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces upwards, and the LED luminescence device is equipped with an LED blinking circuit that causes the LED to blink and a reflective mirror installed across from the abovementioned LED in the vicinity of the top of the inner surface of the globe for reflecting the blinking light from the LED in the prescribed direction.

[Claim 3] A rotating warning lamp consisting of a reflective tube rotated by a motor and lamp placed in this reflective tube and equipped with a rotating lamp made to emit light in a perambulating horizontal direction by rotations of the reflective tube, a base of schematic plates supporting this rotating lamp and a transparent globe that covers the abovementioned base and rotating lamp, where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces upwards, and a reflective mirror installed across from the abovementioned LED in the vicinity of the top of the inner surface of the globe for reflecting the blinking light from the LED in the prescribed direction, and that is equipped with a motor for rotating or oscillating the abovementioned reflective mirror.

[Detailed Description of the invention]

[0001] [Field of Industrial Application] This invention

relates to rotating warning lamps mounted on patrol cars, emergency vehicles, such as ambulance etc, or road service vehicles.

[0002] [Conventional Technology] The rotating warning lamp is mounted on the roofs of patrol cars and other emergency vehicles and road service vehicles, etc., emitting its scattered light signal in a perambulating manner to transmit a warning to other surrounding vehicles and pedestrians.

[0003] The scattered light type of lamps shown in Figures 10 or 12 are examples of this kind of rotating warning lamp.

[0004] This scattered light type of rotating warning lamp (1) is configured with a rotating lamp (4) on a base (3) fixed to both sides of the supporting frame (2) forming the bottom part of the rotating warning lamp, a speaker (5) in the center of the supporting frame (2), a multi-faceted reflective plate (6) between the rotating lamp (4) and the speaker (5) and red, blue, and yellow, etc. transparent globe (7) covering the rotating lamp (4) and the reflective plate (6) reflective plate.

[0005] Also, the abovementioned rotating lamps (4) are configured with halogen, etc. lamps (9) as light sources installed in the center of reflective tube (8) shaped to form 2 seemingly joined symmetrical cup-like shapes, such that the reflective tube (8) is rotated by a drive motor (10) installed on the base (3).

[0006] And, if the reflective tube (8) is rotated by the motor (10) simultaneously with activation of the lamp (9), light is concentrated in the reflecting tube (8) emitting a perambulating beam of directional light in a horizontal direction surrounding the base (3), and the beam of light reflected by the reflective plate (6) is emitted in the forward direction of the rotating warning lamp (1) after it is reflected by the reflective plate (6).

[0007] Additionally, by adjusting the mount position of this reflective plate (6) and the angle of the rotating lamp (4) the light distribution properties of this type revolving warning lampsemit.

[0008] [Problems Solved by the Invention] To improve visibility of the warnings emitted to other vehicles or pedestrians by the rotating warning lamp (1) having the abovementioned structure, in addition to the rotating the reflective tube (8) of the rotating lamp (4) as described above or reflecting the beam of light from the rotating lamp (4) using the reflective plate (6), the most effective method is making the lamp (9) of the rotating lamp (4) itself blink.

[0009] However, since the light (9) in the rotating lamp (4) is incandescent, even if the lamp (9) is made to blink, its blinking is not very sharp and thus cannot be expected to be very effective.

[0010] In addition, in the case of the type of rotating warning lamp (1) mentioned above, since the light emitted from the lamp (9) is cast in a horizontal direction along the periphery of the base (3), light is not emitted in the upward and downward direction of the base (3).

[0011] Therefore, when a rotating warning lamp (1) is attached to the roof of large road service vehicles, downward visibility decreases, or when the service vehicle is used at airports, visibility from the cockpit of an aircraft is poor.

[0012] [Means of Solving the Problem] A rotating warning lamp consisting of a reflective tube rotated by a motor and lamp placed in this reflective tube and equipped with a rotating lamp made to emit light in a perambulating horizontal direction by rotations of the reflective tube, a base of schematic plates supporting this rotating lamp and a transparent globe that covers the abovementioned base and rotating lamp,

[0013], where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces in a horizontal direction, and the LED luminescence device contains an LED blinking circuit that causes the LED abovementioned to blink, or

[0014] where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces upwards, and the LED luminescence device contains an LED blinking circuit that causes the LED to blink and a reflective mirror installed across from the abovementioned LED in the vicinity of the top of the inner surface of the globe for reflecting the blinking light from the LED in the prescribed direction, or

[0015] where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces upwards, and a reflective mirror installed across from the abovementioned LED in the vicinity of the top of the inner surface of the globe for reflecting the blinking light from the LED in the prescribed direction, and that

is equipped with a motor for rotating or oscillating the abovementioned reflective mirror. [0016]

[Mechanism] By causing the LED of an LED luminescence device equipped with a prescribed number of LED 32 and installed on the periphery of the base of a rotating warning lamp to blink, or by reflecting the light from the LED in arbitrary directions using a rotating reflecting mirror, the visibility of the rotating warning.

[0017] [Example of Embodiment] Figures 1 to figure 3 depict the first example of embodiment of the rotating warning lamp (20) in this inventionexample of embodiment.

[0018] In the same figures, (21) is the support frame that forms the bottom for the rotating warning lamp (20) and (21a) is the mounting bracket attached to the bottom of the support frame (21) for fixing the rotating warning lamp (20) to the roof of a vehicle, etc., (22) and is the base unit fixed on both sides of the support frame (21). (23) is the rotating lamp installed on the outer side of base (22). (24) is the speaker installed in the center of the support frame (21). (25) is the reflective plate installed inside the abovementioned base unit (22). Like the conventional lamp, the abovementioned rotating lamps (23) are configured with halogen, etc. lamps (27) as light sources installed in the center of reflective tube (26) shaped to form 2 seemingly joined symmetrical cup-like shapes, such that the reflective tube (26) is rotated by a drive motor (28) installed on the base (22).

[0019] (29) is the transparent globe covering the rotating lamp (23) installed in the base unit (22) and the reflective plate (25). This transparent globe (29) is colored red, blue and yellow.

[0020] (30) is the LED luminescence device installed on the part opposite the transparent globe (29) in the periphery of the base unit (22). This LED luminescence device (30) consists of a strip-like substrate (31) and prescribed number of LEDs (32) arranged in a strip-like array on the base plate (31).

[0021] And, in this example of embodiment, 2 LED luminescence devices (30) are installed so that the LED luminescence component (32) faces upwards and are mounted to each base 22, and the LED (32) of each of the LED luminescence devices (30) are made to blink by the LED blinking circuits (33) integrated in both of the bases (22).

[0022] Furthermore, using the abovementioned LED

blinking circuit (33), the LED (32) on the substrate can be made to blink all at once, or to blink sequentially in a flow pattern, and the blink cycle can be made to be regular or irregular.

[0023] The rotating warning lamp (20) mentioned above is mounted to the roofs of emergency vehicle or service vehicle, such that as the reflective tube (26) of the rotating lamp (23) rotates, the lamp (27) also blinks, and the beams of light from the rotating lamp (23) are emitted to the periphery of the rotating warning lamp, while at the same time, the LED (32) of the LED luminescence device (30) are made to blink, emitting blinking light from the LED (32) toward the front of the rotating warning lamp (20).

[0024] At this time, since the blinking light emitted by the LED (32) luminescence component is very sharp, visibility is good, clearly providing notification of the existence of emergency or service.

[0025] Furthermore, since the blinking light of the flasher of LED (32) is emitted with a certain degree of expansion, the blinking light can be emitted even in the upward or downward direction of the rotating warning lamp (20).

[0026] Therefore, regardless of whether the rotating warning lamp (20) is installed on the roof of large sized service vehicles or on the roof of service vehicles used in airports, the blinking light can be made to emanate in the upward and downward direction of the roof.

[0027] The abovementioned example of embodiment explains the example of an LED luminescence device (30) installed on the front of the base (20). However, the LED luminescence device (30) can also be installed on the rear of the base unit (22) or on the external sides of the base (22) to achieve blinking along the entire periphery of the rotating warning lamp (20).

[0028] Figure 4 and Figure 6 depict the second example of embodiment of the rotating warning lamp (20) in this invention. In this example of the rotating warning lamp (20), the LED luminescence device (30) is positioned such that the luminescence components face upward on the periphery of the base (22), and a reflective mirror (35) is installed at a 45°angle in a position opposite the LED luminescence device in a vertical direction near the upper part of the inside surface of the transparent globe (29), such that this reflective mirror (35) can be used to reflect the blinking light emitted from the LED (32) forward. The remaining

parts are the same as that described in the first example of embodiment.

[0029] Note that although the support components of the reflective mirror (35) are omitted in the illustration, these support components can also be formed to integrate, for example, with the globe (29).

[0030] In this way, by using the reflective mirror (35) to emit the blinking light from the LED luminescence device (30) toward the front of the rotating warning lamp (20) it is possible to achieve extremely sharp blinking light emission, thereby enabling improved visibility.

[0031] Note that although in this example of embodiment the reflective mirror (35) is used to emit the blinking light from the LED luminescence device (30) toward the front of the rotating warning lamp (20), the LED luminescence device (30) can also be installed on the rear of the base unit (22) or on the external sides of the base (22), and a reflective mirror (35) can be installed in a position opposite the LED luminescence device in a vertical direction near the upper part of the inside surface of the transparent globe (29) to emit the blinking light from the LED (32) along the entire periphery of the rotating warning lamp (20).

[0032] Figure 7 and Figure 9 depict the third example of embodiment of the rotating warning lamp (20) in this invention. In this example of the rotating warning lamp (20), the LED luminescence device (30) is positioned such that the luminescence components face upward on the periphery of the base (22), and a double sided reflective mirror (35') is installed in a position opposite the LED luminescence device (30) near the upper part of the inside surface of the transparent globe (29), and this double sided reflective mirror (35') rotates or oscillates using a motor (36). In this example of embodiment, the LED (32) can be left on, and since it is not necessary to make them blink, the structure is not configured with an LED blinking circuit.

[0033] In other words, if the double-sided reflective mirror (35') that rotates or oscillates is used to emit the light from the LED luminescence device (30) out from the transparent globe, when the double-sided reflective mirror (35') is vertically oriented, the light from the LED (32) will be emitted in the upward direction of the rotating warning lamp (20), and when the double-sided reflective mirror (35') is oriented in a non-vertical direction, the light from the LED (32) will be emitted in downward and diagonally in the back to front direction,

horizontally in the back to front direction, upward and diagonally in the back to front direction of the rotating warning lamp (20) in accordance with the angle of the double-sided reflective mirror (35').

[0034] Note that in this example of embodiment, the LED luminescence device (30) is installed only on the front of the base (22). The double-sided reflective mirror (35') is installed so as to revolve freely in a position opposite the LED luminescence device (3) in the upper part of the inside surface of the transparent globe. Although this structure is configured such that the light from the LED (32) can be emitted in the vertical and back to front directions of the revolving warning lamp (20) using the double-sided reflective mirror (35'), the LED luminescence device (30) can also be installed on the rear and outer sides of the base (22) and the double-sided reflective mirror (35') can be installed so as to revolve freely in a position opposite the LED luminescence device (3) in the upper part of the inside surface of the transparent globe (29) to emit the blinking light from the LED (32) along the entire periphery, including the vertical direction, of the rotating warning lamp (20).

[0035]

[Advantageous Effect of the Invention] AS explained above, this invention substantially enhances the visibility of the rotating warning lamp by causing the LED of an LED luminescence device equipped with a prescribed number of LED and installed on the periphery of the base of a rotating warning lamp to blink, thus achieving extremely sharp emission of blinking light to the periphery of the rotating warning lamp, and by causing the blinking light from the LED to be emitted in an expanding fashion.

[0036] In addition, by reflecting the blinking light from the LED using a reflective mirror, it is possible to set the direction of emission freely. And when the reflective mirror is rotated while the LED is on, the light from the LED can be emitted across a broad range, and since it seems from the outside that the light from the LED is blinking, in this case as well, visibility is significantly enhanced.

[Brief Description of the Figures]

[Figure 1] Figure indicating the front view of the first example of embodiment of the rotating warning lamp in this invention

[Figure 2] Two-dimensional view figure of the same rotating warning lamp

[Figure 3] Side view figure of the same rotating warning lamp

[Figure 4] Figure indicating the side view of the second example of embodiment of the rotating warning lamp in this invention

[Figure 5] Front view figure of the same rotating warning lamp

[Figure 6] Two-dimensional view figure of the same rotating warning lamp

[Figure 7] Figure indicating the front view of the third example of embodiment of the rotating warning lamp in this invention

[Figure 8] Two-dimensional view figure of the same rotating warning lamp

[Figure 9] Side view figure of the same rotating warning lamp

[Figure 10] Side view figure of a conventional rotating warning lamp

[Figure 11] Front view figure of the same rotating warning lamp

[Figure 12] Two-dimensional view figure of the same rotating warning lamp

[Description of Codes]

20 Rotating warning lamp

21 Support frame

22 Base unit

23 Rotating lamp

25 Reflective plate

26 Reflective tube

27 Lamp

28 Motor

29 Transparent globe

30 LED

31 Substrate

32 LED

33 LED on/off light

35 Reflective mirror

35' Reflective mirror

36 Motor

Figure 1

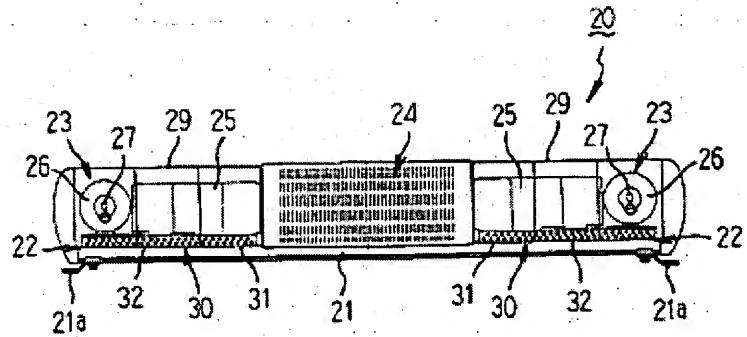


Figure 3

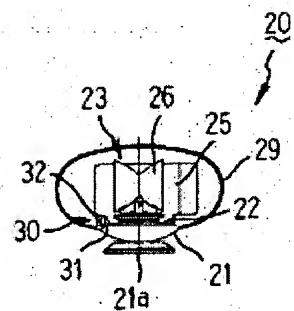


Figure 2

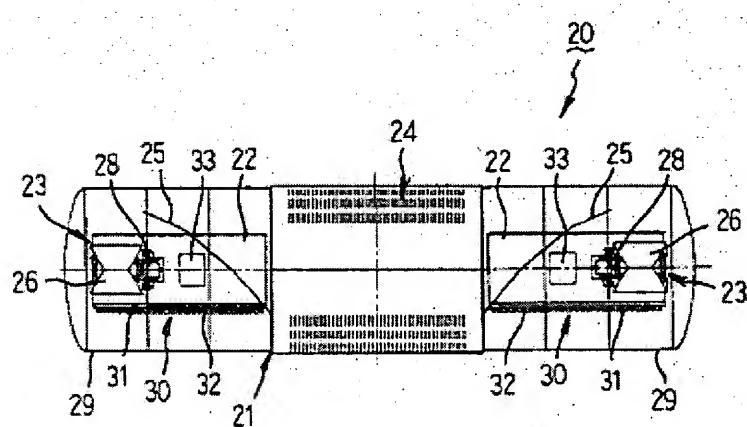


Figure 4

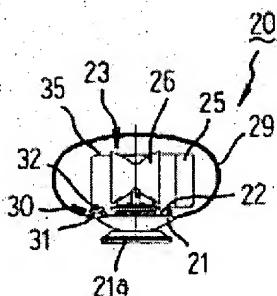


Figure 5

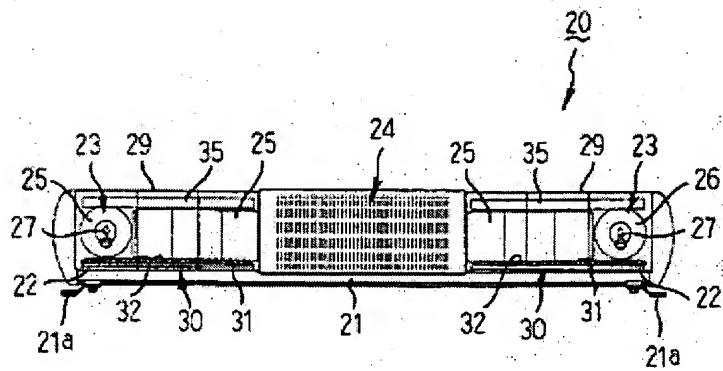


Figure 9

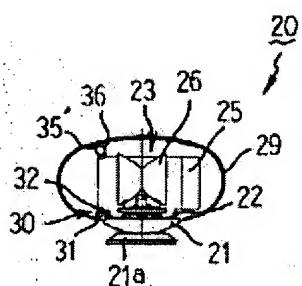


Figure 6

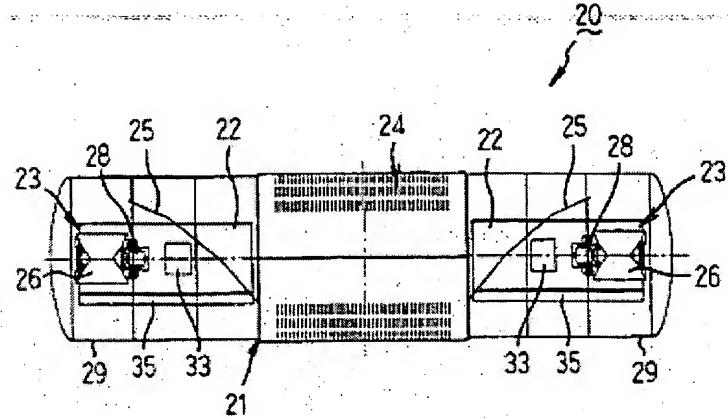


Figure 10

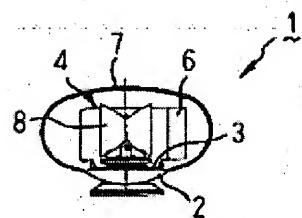


Figure 7

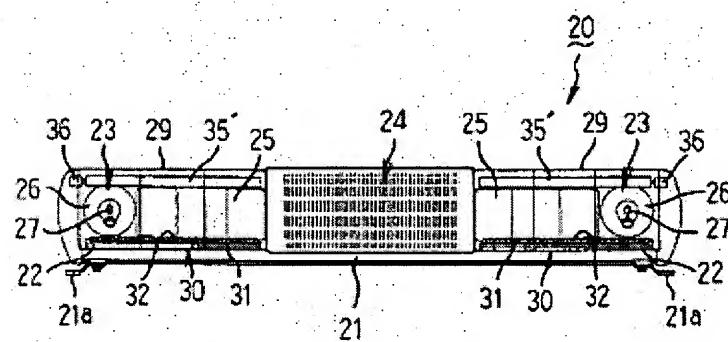


Figure 8

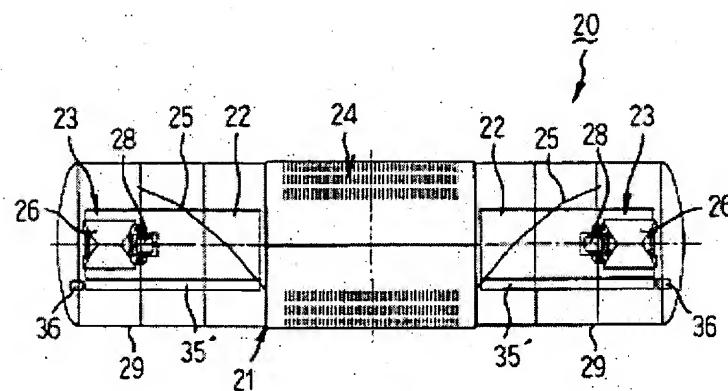


Figure 11

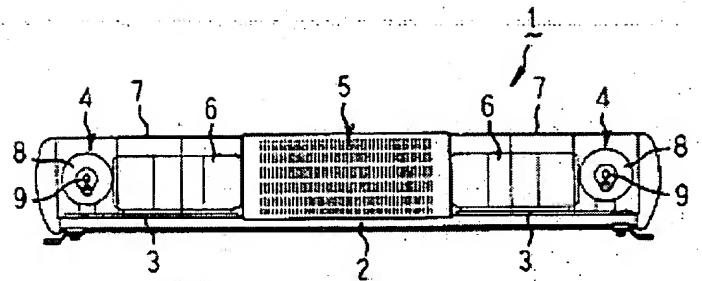
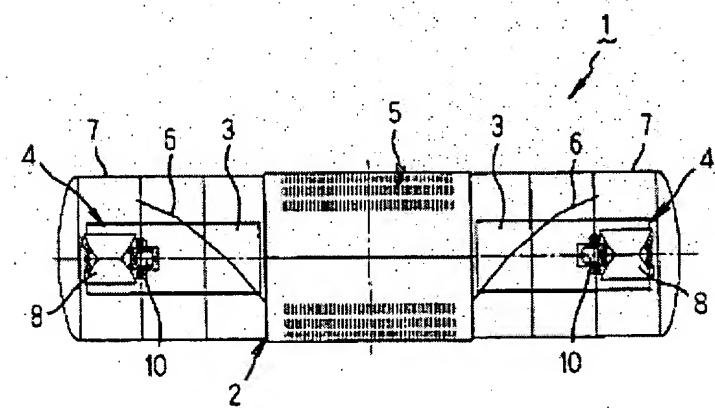


Figure 12

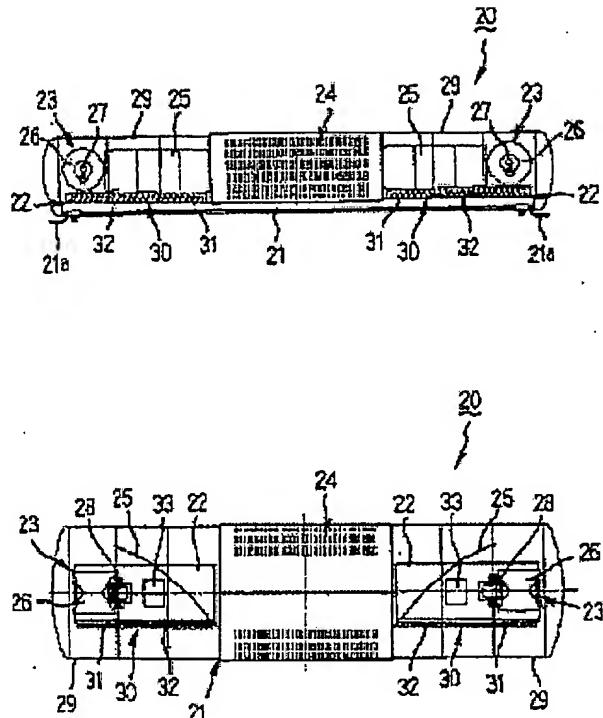


ROTARY ALARM LAMP

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Inventor: KAMIOKA MIKIYOSHI
Applicant: OSAKA SAIREN SEISAKUSHO KK
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 - **European:**
Application number: JP19930118027 19930520
Priority number(s): JP19930118027 19930520

Abstract of JP6333403

PURPOSE: To improve the visibility of a rotary alarm lamp largely by disposing an LED light emitter comprising a specified number of light emitting diodes disposed in a belt line along a peripheral edge part of a base to direct horizontally, and flashing the light emitting diodes. **CONSTITUTION:** An LED light emitter 30 is disposed at a facing part to a transparent globe 29 in a peripheral edge part of a base 22 of a rotary alarm lamp 20, where this LED light emitter is composed of a belt-shaped base plate 31, and a specified number of light emitting diodes 32 disposed in a belt line on the base plate 31. This LED light emitter 30 is disposed at a front edge part of each base 22, setting each light emitting diode 32 with its light emission part directed horizontally, and the light emitting diodes 32 in each LED light emitter 30 are flashed by an LED flashing circuit 33 assembled in each base. An extremely sharply flashing flash light can thus be radiated toward around the rotary alarm lamp 20, and the flash light having a certain degree of enlargement around it, thereby the visibility of the rotary alarm lamp 20 can be improved largely.



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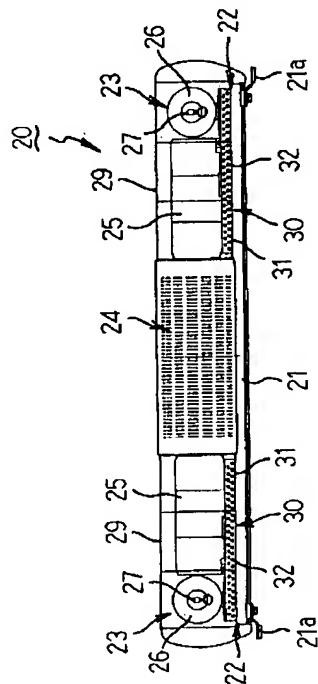
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(54)【発明の名称】 回転警告灯

(57)【要約】 (修正有)

【目的】 回転警告灯の視認性の向上を目的とする。

【構成】 回転警告灯20の基台22の周縁部に、所定数のLED32を有するLED発光器30を配置し、このLED32を点滅させるか、或いは、LED32からの光を回転駆動する反射鏡によって任意の方向に向けて照射させることにより、回転警告灯20の視認性を大幅に向上させるものである。



【特許請求の範囲】

【請求項 1】 モータによって回転する反射筒及びこの反射筒内に配置したランプからなり、反射筒の回転により照射光を水平方向に巡回照射する回転灯と、この回転灯を支持する略平板状をした基台と、上記基台及び回転灯を覆う透明グローブとを備えた回転警告灯に於いて、上記基台の周縁部に、帯状に整列配置された所定数のLEDからなるLED発光器を、LEDの発光部が水平方向を向くようにして配設し、かつ、上記LED発光部のLEDを点滅させるためのLED点滅回路を組込んだことを特徴とする回転警告灯。

【請求項 2】 モータによって回転する反射筒及びこの反射筒内に配置したランプからなり、反射筒の回転により照射光を水平方向に巡回照射する回転灯と、この回転灯を支持する略平板状をした基台と、上記基台及び回転灯を覆う透明グローブとを備えた回転警告灯に於いて、上記基台の周縁部に、帯状に整列配置された所定数のLEDからなるLED発光器を、LEDの発光部が上方を向くようにして配設し、上記LED発光部のLEDを点滅させるためのLED点滅回路を組込み、かつ、グローブ内側面上部近傍の上記LEDと対向する位置に、LEDからの点滅光を所定の方向に向けて反射させるための反射鏡を配置したことを特徴とする回転警告灯。

【請求項 3】 モータによって回転する反射筒及びこの反射筒内に配置したランプからなり、反射筒の回転により照射光を水平方向に巡回照射する回転灯と、この回転灯を支持する略平板状をした基台と、上記基台及び回転灯を覆う透明グローブとを備えた回転警告灯に於いて、上記基台の周縁部に、帯状に整列配置された所定数のLEDからなるLED発光器を、LEDの発光部が上方を向くようにして配設し、グローブ内側面上部近傍の上記LEDと対向する位置に、LEDからの光を反射させるための反射鏡を配置し、かつ、上記反射鏡をモータによって回転又は揺動駆動させることを特徴とする回転警告灯。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、パトロールカー、救急自動車等の緊急自動車或いは道路作業車等に取付ける回転警告灯に関するものである。

【0002】

【従来の技術】 回転警告灯は、パトロールカー等の緊急自動車や道路作業車等のルーフに取付けられ、周囲に散光信号を巡回照射して他の車両や歩行者等に警告を発するものである。

【0003】 このような回転警告灯としては、例えば、図10乃至図12に示す散光式のものがある。

【0004】 この散光式の回転警告灯(1)は、回転警告灯の底部を形成する支持フレーム(2)の両側に固設した基台(3)上に回転灯(4)を配置し、支持フレーム(2)の中

央部にスピーカー(5)を配置し、回転灯(4)とスピーカー(5)との間に複数反射面を有する反射板(6)を配置し、更に、回転灯(4)及び反射板(6)を赤、青、黄色等に着色した透明グローブ(7)で覆った構成をしている。

【0005】 また、上記回転灯(4)は、2つの碗形状体を接合した如き対称な形状をなす反射筒(8)の中心部にハロゲンランプ等の光源となるランプ(9)を配設した構造をしており、基台(3)に配置した駆動用のモータ(10)によって反射筒(8)を回転させる構造をとっている。

【0006】 そして、ランプ(9)を点灯させると同時に、モータ(10)によって反射筒(8)を回転させれば、反射筒(8)で集光され、指向性をもった光束が基台(3)周囲の水平方向に向けて巡回照射され、また、反射板(6)に照射された光束は、反射板(6)で反射された後、回転警告灯(1)の前方に向けて照射される。

【0007】 また、この種の回転警告灯(1)は、この反射板(6)の取付け位置や回転灯(4)に対する角度を調整すれば、配光特性を自由に変更できる。

【0008】

【発明が解決しようとする課題】 上記した構造を有する回転警告灯(1)により他の車両や歩行者等に警告を発する場合、視認性を向上させるためには、上述した如く、回転灯(4)の反射筒(8)を回転させたり、回転灯(4)からの光束を反射板(6)で反射させる以外に、回転灯(4)のランプ(9)自体を点滅させるのが最も効果的である。

【0009】 しかし、回転灯(4)に組込まれているランプ(9)は白熱灯であるため、ランプ(9)を点滅させても、その点滅がシャープでないため、視認性向上の効果があまり期待できないといった問題があった。

【0010】 また、上記形式の回転警告灯(1)は、ランプ(9)からの照射光が基台(3)周囲の水平方向に向けて照射されるため、基台(3)の上方及び下方には照射光がほとんど照射されない。

【0011】 このため、回転警告灯(1)を大型の道路作業車のルーフに取付けると、下方からの視認性が低下し、また、作業用自動車が空港で使用される車両の場合には、航空機の操縦席からの視認性が悪いといった問題があった。

【0012】

【課題を解決するための手段】 モータによって回転する反射筒及びこの反射筒内に配置したランプからなり、反射筒の回転により照射光を水平方向に巡回照射する回転灯と、この回転灯を支持する略平板状をした基台と、上記基台及び回転灯を覆う透明グローブとを備えた回転警告灯に於いて、

【0013】 上記基台の周縁部に、帯状に整列配置された所定数のLEDからなるLED発光器を、LEDの発光部が水平方向を向くようにして配設し、かつ、上記LED発光部のLEDを点滅させるためのLED点滅回路を組込むか、

【0014】或いは、上記基台の周縁部に、帯状に整列配置された所定数のLEDからなるLED発光器を、LEDの発光部が上方を向くようにして配設し、上記LED発光部のLEDを点滅させるためのLED点滅回路を組込み、かつ、グローブ内側面上部近傍の上記LEDと対向する位置に、LEDからの点滅光を所定の方向に向けて反射させるための反射鏡を配置するか、

【0015】或いは、上記基台の周縁部に、帯状に整列配置された所定数のLEDからなるLED発光器を、LEDの発光部が上方を向くようにして配設し、グローブ内側面上部近傍の上記LEDと対向する位置に、LEDからの光を反射させるための反射鏡を配置し、かつ、上記反射鏡をモータによって回転又は揺動駆動せるものである。

【0016】

【作用】上記した如く、回転警告灯の基台の周縁部に、所定数のLEDを有するLED発光器を配置し、このLEDを点滅させるか、或いは、LEDからの光を固定状態に支持された反射鏡、又は、回転駆動する反射鏡によって任意の方向に向けて照射されることにより、回転警告灯の視認性を大幅に向上せるものである。

【0017】

【実施例】図1乃至図3は、本発明に係る回転警告灯(20)の第1の実施例を示すものである。

【0018】同図に於いて、(21)は、回転警告灯(20)の底部を形成する支持フレーム、(21a)は、支持フレーム(21)の底部に固設した、回転警告灯(20)を車両のルーフ等に固定するための取付けブラケット、(22)は、支持フレーム(21)の両側に固設した基台、(23)は、基台(22)上の外方側に配置した回転灯、(24)は、支持フレーム(21)の中央部に配置したスピーカー、(25)は、基台(22)上の内方側に配置した反射板であり、上記回転灯(23)は、従来と同様、2つの椀形状体を接合した如き対称の形状をなす反射筒(26)の中心部にハログンランプ等の光源となるランプ(27)を配置した構造をしており、基台(22)上に配置した駆動用のモータ(28)で反射筒(26)を回転させる構造をとっている。

【0019】(29)は、基台(22)上に配置した、回転灯(23)及び反射板(25)を覆う透明グローブであり、この透明グローブ(29)は、赤、青、黄色等に着色されている。

【0020】(30)は、基台(22)の周縁部の内、透明グローブ(29)と対向する部分に配置されるLED発光器であり、このLED発光器(30)は、帯板状をした基板(31)と、基板(31)上に帯状に整列配置された所定数のLED(32)とからなっている。

【0021】そして、この実施例では、2台のLED発光器(30)を、各LED(32)の発光部が水平方向を向くようにして、両基台(22)の前縁部に配置してあり、各LED発光器(30)のLED(32)は、両基台(22)内にそれぞれ組込まれたLED点滅回路(33)によって点滅するように

してある。

【0022】また、上記LED点滅回路(33)によるLED(32)の点滅は、基板(31)上のLED(32)を一齊に点滅させる以外に、各LED(32)を順次点滅させて行くプロ一点滅としてもよく、更に、点滅の周期は、規則的にする以外に不規則としてもよい。

【0023】上記構成からなる回転警告灯(20)を、緊急自動車や作業用自動車のルーフ等に取付け、回転灯(23)の反射筒(26)を回転させると共にランプ(27)を点灯させ、回転灯(23)からの集束光を回転警告灯(20)の周囲に照射すると同時に、LED発光器(30)のLED(32)を点滅させると、LED(32)からの点滅光は、回転警告灯(20)の前方に向けて照射される。

【0024】この時、LED(32)からの点滅光は、その点滅が非常にシャープであるため、視認性が非常に良く、緊急自動車や作業用自動車の存在を確実に告知できる。

【0025】また、LED(32)の発光部からの点滅光は、ある程度の広がりを持って照射されるため、回転警告灯(20)の上方及び下方に向けてでも点滅光は照射される。

【0026】従って、回転警告灯(20)を大型の作業用自動車のルーフに取付けたり、空港で使用する作業用自動車のルーフに取付けても、点滅光をルーフの上方及び下方に向けて照射することができる。

【0027】尚、上記実施例は、LED発光器(30)を基台(22)の前縁部に配置した例について説明したが、LED発光器(30)は、基台(22)の後縁部及び外方側の側縁部にも配置し、回転警告灯(20)の周囲全周に向けて点滅光を照射するようにもよい。

【0028】図4乃至図6は、本発明に係る回転警告灯(20)の第2の実施例を示すものであり、この実施例に示す回転警告灯(20)は、基台(22)の周縁部に、LED(32)の発光部が上方を向くようにしてLED発光器(30)を配置し、かつ、透明グローブ(29)内側面の上方部の近傍であって、上記LED発光器(30)と上下方向に対向する位置に反射鏡(35)を45°の角度で配置し、この反射鏡(35)によってLED(32)からの点滅光を反射させ、前方に向けて照射するものであり、それ以外の部分は第1の実施例と同様である。

【0029】尚、反射鏡(35)の支持部材は図示省略しているが、この支持部材は、例えばグローブ(29)内に一体的に形成すればよい。

【0030】このように、LED発光器(30)からの点滅光を反射鏡(35)を使用して回転警告灯(20)の前方に向けて照射すれば、非常にシャープに点滅する点滅光を照射することが可能となり、回転警告灯(20)の視認性を向上できる。

【0031】尚、この実施例では、LED(32)からの点滅光を反射鏡(35)によって回転警告灯(20)の前方に向け

て照射させるようにしているが、LED発光器(30)を基台(22)の後縁部及び外方側の側縁部にも配置し、更に、透明グローブ(29)内側面上方部近傍であってこのLED発光器(30)と対向する位置にも反射鏡(35)を配置し、LED(32)からの点滅光を回転警告灯(20)の周囲全周に向けて照射するようにしてもよい。

【0032】図7乃至図9は、本発明に係る回転警告灯(20)の第3の実施例を示すものであり、この実施例に示す回転警告灯(20)は、基台(22)の周縁部に、LED(32)の発光部が上方を向くようにしてLED発光器(30)を配置し、かつ、透明グローブ(29)内側面の上方部近傍の内、上記LED発光器(30)と対向する位置に両面反射鏡(35')を配置し、更に、この両面反射鏡(35')をモータ(36)によって回転又は揺動させるようにしたものであり、この実施例の場合、LED(32)は点灯させたままでよく、点滅させる必要はないため、LED点滅回路は組込まれていない。

【0033】すなわち、LED発光器(30)からの光を回転又は揺動している両面反射鏡(35')を介して透明グローブ(29)の外方に向けて照射すれば、両面反射鏡(35')が垂直方向を向いている時には、LED(32)からの光は回転警告灯(20)の上方に向けて照射され、また、反射鏡(35')が垂直方向以外の姿勢をとる時には、両面反射鏡(35')の角度に応じてLED(32)からの光は回転警告灯(20)の前後方向斜め下方、前後水平方向、前後方向斜め上方の各方向に向けて照射される。

【0034】尚、この実施例では、基台(22)の前縁部にのみLED発光器(30)を配置し、透明グローブ(29)内側面上方部近傍のLED発光器(30)と対向する位置に両面反射鏡(35')を回転自在に配置し、LED(32)からの点滅光を両面反射鏡(35')によって回転警告灯(20)の上下方向を含む前後方に向けて照射させるようにしているが、LED発光器(30)を基台(22)の後縁部及び外方側の側縁部にも配置し、更に、透明グローブ(29)内側面上方部近傍であってこのLED発光器(30)と対向する位置にも両面反射鏡(35')を回転又は揺動自在に配置し、LED(32)からの点滅光を回転警告灯(20)の上下方向を含む周囲全周に向けて照射するようにしてもよい。

【0035】

【発明の効果】以上説明した如く、本発明は、回転警告灯の基台の周縁部に、所定数のLEDを有するLED発光器を、このLEDの発光部が水平方向を向くように配置し、このLEDを点滅させるようにしたから、非常にシャープに点滅する点滅光を回転警告灯の周囲に向けて

照射することが可能となり、かつ、このLEDからの点滅光は、ある程度の広がりを持って周囲に照射されるため、回転警告灯の視認性を大幅に向かうことができる。

【0036】また、LEDからの点滅光を反射鏡を使用して反射させるようにすれば、LEDからの点滅光の照射方向を自由に設定することが可能となり、更に、LEDは点灯状態のままでし、反射鏡を回転すれば、LEDからの光を広範囲に渡って照射することが可能になると同時に、外部からはLEDからの光が点滅しているよう見えるため、この場合も視認性を大幅に向かうことができる。

【図面の簡単な説明】

【図1】本発明に係る回転警告灯の第1の実施例を示す正面図。

【図2】同回転警告灯の平面図。

【図3】同回転警告灯の側面図。

【図4】本発明に係る回転警告灯の第2の実施例を示す側面図。

【図5】同回転警告灯の正面図。

【図6】同回転警告灯の平面図。

【図7】本発明に係る回転警告灯の第3の実施例を示す正面図。

【図8】同回転警告灯の平面図。

【図9】同回転警告灯の側面図。

【図10】従来の回転警告灯を示す側面図。

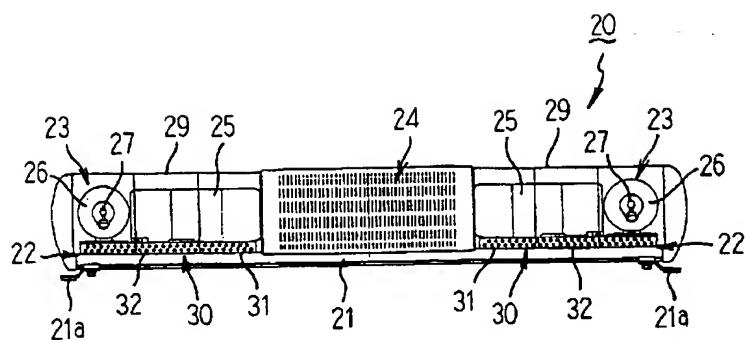
【図11】同回転警告灯の正面図。

【図12】同回転警告灯の平面図。

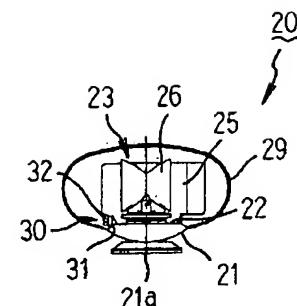
【符号の説明】

20	回転警告灯
21	支持フレーム
22	基台
23	回転灯
25	反射板
26	反射筒
27	ランプ
28	モータ
29	透明グローブ
30	LED発光器
31	基板
32	LED
33	LED点滅回路
35	反射鏡
35'	反射鏡
36	モータ

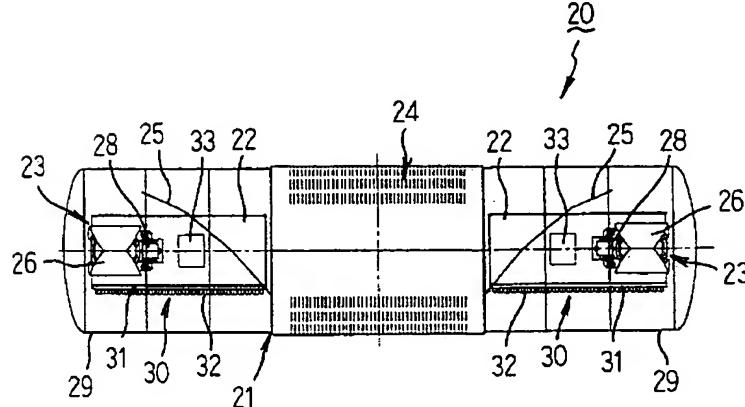
【図1】



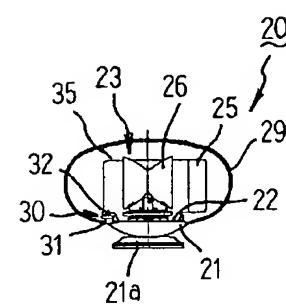
【図3】



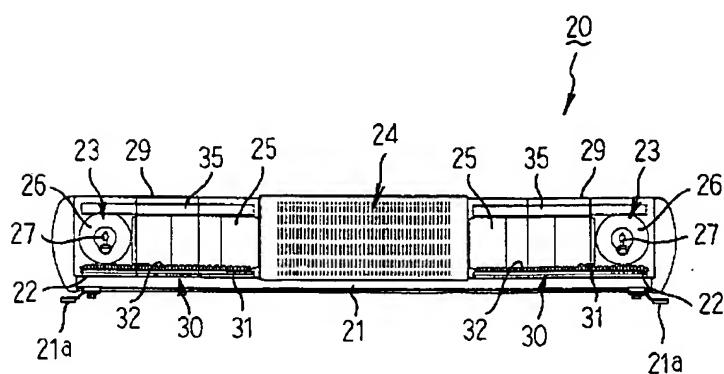
【図2】



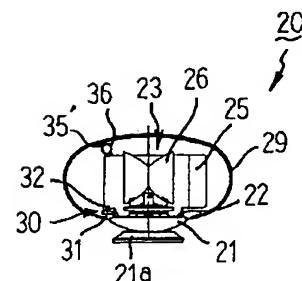
【図4】



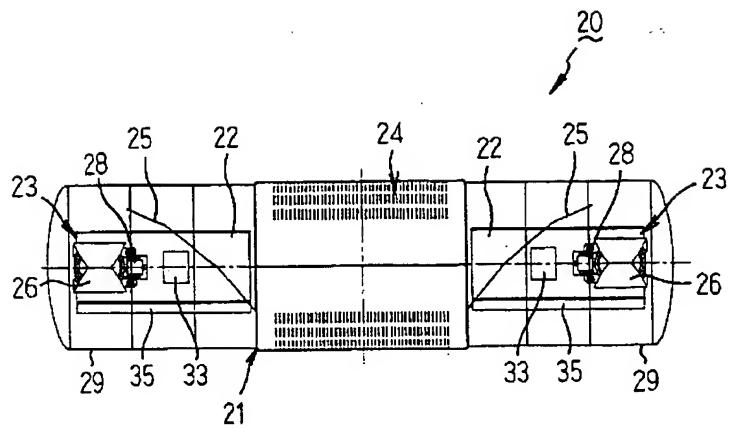
【図5】



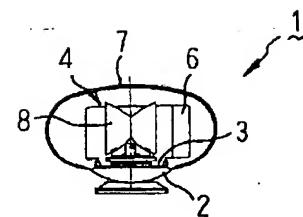
【図9】



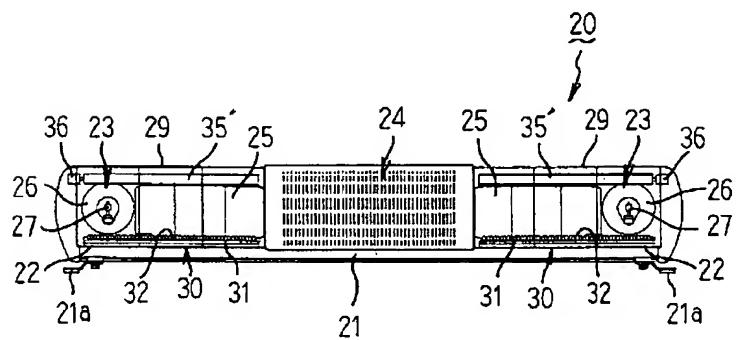
【図6】



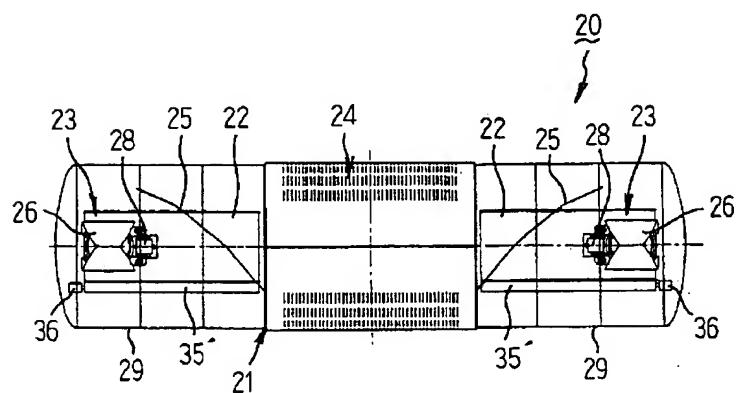
【図10】



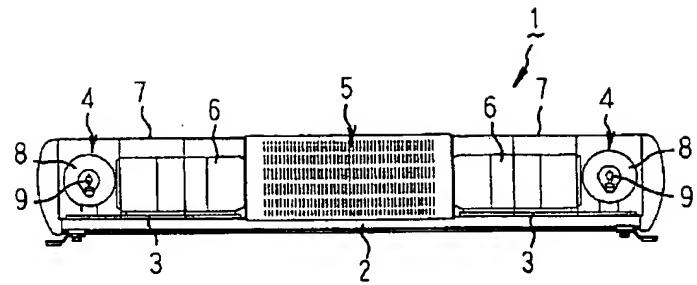
【図7】



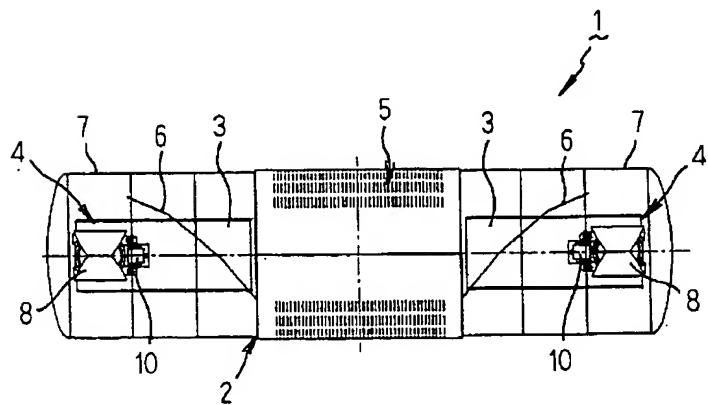
【図8】



【図11】



【図12】



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